Inland Water Transportation*

By

Michael W. Woolverton
Assistant Professor
Department of Agricultural
Economics and Rural Sociology
The Ohio State University

I am very glad to be with you today. My topic is "Inland Water Transportation".

I became involved in Inland Water Transportation when I was a graduate student at the University of Missouri. The University of Missouri, along with Iowa State University and Louisiana State University, was involved in a study funded by the USDA. The study dealt with the transportation of grain and fertilizer on inland waterways. Researchers at Iowa State were to examine grain origination and fertilizer distribution in the major upper midwestern grain producting states. Our task at Missouri was to study the movement of these commodities on the Mississippi River System. The main thrust of the research to be done at L.S.U. was the analysis of impediments to river barge operations in the Port of New Orleans.

My job was to coordinate the Missouri portion of the study. As the study progressed I was able to base my dissertation on part of the research we were conducting. There were several parts to my dissertation. In the first part I wrote about the structure of the grain barging industry. I also developed a cost simulation model to generate the cost to barge grain. I also analyzed fluctuations in the price of grain barging services.

While no one was watching the inland waterways have again become an important mode of transportation. In 1975, the waterway portion of total intercity freight traffic was approximately 12%. Contrast that to the 1960 waterway portion of 9%. Of course, rail was still the leader with 37% of total intercity freight traffic

---

*A speech presented to the Ohio Agricultural Marketing Forum in Columbus, Ohio, July 21, 1978.

in 1975, but rail share of the traffic has been slipping. Some of the freight has shifted to barge and pipelines. Pipelines have experienced a dramatic increase in traffic in the past few years. Surprising as it might seem, the trucking share of intercity freight traffic remained constant from 1960 to 1975.

The most important part of our inland waterway system is the Mississippi River System. The Mississippi River System is comprised of the main stem of the Mississippi River and its tributaries including the Ohio, the Illinois, the Missouri, the Tennessee and the Arkansas rivers. While the Mississippi River System makes up only about one-fourth of the total 25,400 miles of navigable waterways in the U.S. it carries about 2/3 of all waterway commercial freight. The Ohio River accounts for about 20% of the commercial freight carried on the Mississippi River System.

To give you an idea of how important the Ohio River is to agriculture in the State of Ohio, last year the Port of Toledo experienced record grain shipments of approximately 140 million bushels. The amount of grain shipped out of southern Ohio on the river was about 100 million bushels. I haven't done research on that statistic so I have no figures on the rate of river traffic growth but I believe the amount of grain shipped on the Ohio River out of the State of Ohio will soon equal that shipped out of the Port of Toledo.

Guess which commodity is the most important in terms of tonnage shipped on our inland waterway system? That's right - it is coal. In terms of tonnage shipped, coal is the most important commodity shipped on the rivers. Second to coal is petroleum. Grain is the third most important commodity in terms of volume shipped. Sand and gravel are also important commodities but the distance of travel is very, very short. These commodities are followed in order of importance by chemicals, including agricultural fertilizers, and steel products.

I think when we mention river transportation to many people it brings visions of the old steam powered paddle wheelers. People also probably think about riverboat gamblers, bales of cotton piled high on the decks, and Tom Sawyer and Huckleberry Finn.

That system was destroyed during the Civil War. Both armies struggled to gain control of the waterways and in so doing burned the riverboats and destroyed harbor facilities. Following the Civil War riverboats were replaced by railroads.

There were good reasons for the shift to railroads. Rail was able to overcome some of the limitations inherent to inland water transportation. For example, rail lines could be built anywhere. River traffic has to follow the river. Climate is another limitation to inland water transportation that rail can overcome. Rivers freeze up in the wintertime. In times of dry weather, low water becomes a problem for river transportation.

Interest in inland waterways really was not rekindled until World War I. During World War I, the railroad system simply couldn't handle all the freight. Rail rates rose dramatically. Soon there were calls for rebuilding the inland waterway system.

Efforts to rebuild the inland waterways took several directions. On the Lower Mississippi River and the free-flowing tributaries the waterway improvements took the form of bankline structures. Bankline structures directed the flow of water so the water force would scour out the riverbed creating a transportation channel. In those areas where silt and sand settled to the bottom of the transportation channel, dredging was necessary to remove the deposits. On the Upper Mississippi River and most of the major tributaries including the Ohio River, improvement to navigation took the form of channelization. Channelization of a waterway is accomplished by building a series of locks and dams. Dams regulate the water level in pools. Pools are formed upstream of the dams and are simply elongated lakes in which towboats and barges can travel. The locks form a series of elevators which raise and lower ves-

sels in stairstep fashion so the vessels can travel up and down the rivers. There are 28 locks and dams on the Upper Mississippi River and 27 locks and dams on the Ohio River. To give you another idea of the importance of the Ohio River in the inland waterway system, there are approximately 70,000 lockages per year on the Upper Mississippi River compared to approximately 125,000 lockages per year on the Ohio River.

Today, the U.S. Army Corps of Engineers maintains nine foot navigational channels on the Upper Mississippi River and most of the major tributaries. The Lower Mississippi River is maintained at a minimum 12 foot channel depth. I might mention here that there is some interest in maintaining a minimum 12 foot channel on all waterways in the Mississippi River System. This could become very important. For each additional inch added to the draft of a barge, approximately 17 tons of freight can be loaded on that barge. Three feet additional draft would allow the load carried by each barge to be increased by approximately 600 tons. The increased tonnage would cause the cost of movement to increase only slightly resulting in substantial reduction in the per ton cost to transport commodities on the inland waterways.

To date, the total federal investment in the inland waterway system is approximately four and one-half billion dollars. Those are good dollars; pre-inflation dollars. The annual operating and maintenance expense is approximately 150 million dollars.

In 1975, the U.S. Army Corps of Engineers made a proposal to replace Lock and Dam No. 26 on the Upper Mississippi River near Alton, Illinois. Lock and Dam No. 26 was near the end of its 50 year life span. It was operating above its intended capacity. Cracks in the structure and water flowing under the dam caused some concern that the dam may be washed out. The cost of the new structure was estimated to be 400 million dollars.

Eventually all the locks and dams on the inland waterway system will need to be replaced. Lock and Dam No. 26 was scheduled for replacement first because of its poor condition. Many of the other lock and dam combinations have reached their rated capacity. All will come to the end of their intended life spans in the next 25 years.

The Lock and Dam No. 26 replacement project was halted because of a suit filed by environmentalists and a group of railroads. The points made in the suit by the plaintiffs were: 1. The environmental impact statement made by the Army Corps of Engineers was inadequate. 2. The Lock and Dam No. 26 replacement project required Congressional approval because it represented the first step in rebuilding the entire Mississippi River System.

The major issue here, the real issue, was: should the users of the inland waterway system bear the cost of building and maintaining the waterways? The railroads contended that since they owned and had to maintain their rails and rights-of-way the users of the waterways should bear the cost of building and maintaining the waterways.

Barge operators and the shippers who use barge transportation rested their case against users fees on the fact that the initial legislation passed in 1824 stated that navigable waterways should be open to all wishing to use them without fees or taxes of any kind. Back in those days, the early 1800s, a major issue was states' rights. Congress wanted to make sure that states would not impose taxes on people using the navigable waterways flowing through their states or along their state borders.

The Corps of Engineers completed a revised environmental impact statement to satisfy part of the requirements imposed on them by the federal judge issuing the injunction. In the new environmental impact statement researchers took a closer

look at the effects of dredging and the deposition of dredge materials. Because the new structure would be built two miles below the old structure, they also studied the effects on wildlife of relocating Lock and Dam No. 26.

Several bills relating to this issue were introduced in Congress. The House passed a bill late in 1977. The Senate version of the bill was passed early in 1978. These bills are now in joint committee so the differences may be reconciled. Both bills call for the replacement of Lock and Dam No. 26. Both bills also contain provisions meant to recover the cost of building the new structure and part of the annual operating and maintenance expense for the entire inland waterway system.

The major difference in the two bills is the amount of users tax to be imposed. Both bills call for a tax on the users of the inland waterway system in the form of fuel taxes. The tax on fuel in the House version of the bill is 4 cents per gallon, to go into effect October 1979. The tax would jump to 6 cents per gallon two years later. In the Senate bill, the tax is 4 cents per gallon to start in 1982. Eventually, the tax would be increased to 12 cents per gallon.

Towboats consume large amounts of fuel. A 10,000 H.P. towboat is approximately 300 feet long, much of which is fuel tank. A towboat of that size could carry approximately 200,000 gallons of diesel fuel on board. It might use 10,000 gallons of fuel in a 24 hour day.

Even though towboats consume large amounts of fuel the tonnage of freight per shipment is quite large. As a result, the impact of the proposed user charges in the form of fuel taxes will be modest. For example, some research I conducted indicates that a fuel tax of 10 cents per gallon would increase the cost to barge grain the full length of the Mississippi River System, Minneapolis to New Orleans, approximately 42 cents per ton or about 1 cent per bushel.

However, the Carter Administration has threatened to veto any bill to replace Lock and Dam No. 26 unless it contains provisions to fully pay for the new structure

and pay for at least one-half of the annual O. and M. expenditures. In order to fully recover the cost to construct the new Locks and Dam No. 26 and provide enough additional revenue to pay for one-half of annual federal inland waterway operating expenditures the tax on fuel should be nearly 40 cents per gallon. A fuel tax of that magnitude would have a significant impact on the movement of commodities by water. Particularly affected could be long haul shipment of grain, fertilizer and petroleum products. Several studies indicate there will be a substantial shifting of these commodities to alternative modes of transportation if a 40 cent per gallon fuel tax were to be imposed.

The level of taxation and appropriation of funds to replace each of the 150 or so lock and dam combinations on the inland waterway system will be continuing issues in water transportation. Pressure will be exerted on congressmen to pass legislation providing for the recovery of funds used to rebuild each set of locks and dams. Also, the legislators will be urged to increase the rate of taxation to yield revenues sufficient to pay at least half if not all federal inland waterway operating and maintenance expenditures. There could also be presssure to close down portions of the inland waterway system that are very costly to maintain. Some rivers, such as the Kentucky, Arkansas, and Missouri rivers require substantially higher operating and maintenance expenditures per ton mile of freight carried than low cost rivers such as the Lower Mississippi and the Ohio.

There are several other impacts that should be examined to determine the full effect of the legislation. For example, barge transportation should be compared to rail transportation to determine which has the comparative advantage in which areas. Researchers need to examine the ability of rail to carry the additional freight should the shift in transportation modes occur. We need to look at the effects of the fuel tax on barge firms, shippers, producers, and consumers of those products carried on the inland waterways. It would also be useful to examine the

effect on industrial development of communities as the balance between modes is altered.

What I have tried to do today is present to you a brief overview of the water transportation situation and a synopsis of the research that has been done up to now.